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HARRITY & SNYDER, LLP
11240 WAPLES MILL ROAD
SUITE 300
FAIRFAX, VA 22030

EXAMINER	
DODDS, HAROLD E	

ART UNIT	PAPER NUMBER
2167	

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

X1

Office Action Summary	Application No.	Applicant(s)	
	10/029,883	CHARIKAR, MOSES SAMSON	
	Examiner	**Art Unit**	
	Harold E. Dodds, Jr.	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 09 May 2005.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-29 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-29 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 27 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The use of a computer is critical or essential to the practice of the invention, but is not included in the claim(s) and is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). The Specification provides adequate support for the implementation of the proposed invention on a computer on pages 5 and 6, but neither the preamble nor any of the limitations included in independent claim 27 provides any language indicating that a step was performed using a computer.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claim 27 is rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. The language of the claim raises a question as to whether the claim is directed merely to an abstracted idea that is not tied to a technological art, environment, or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101. Modification of the preambles of the independent claims

with language stating implementation of these methods on a computer would overcome this rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-5, 7-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri et al. (U.S. Patent No. 5,806,061), Dasgupta (U.S. Patent No. 5,612,865), Lazarus et al. (U.S. Patent No. 6,134,532), and Kaufman et al. (U.S. Patent No. 5,101,475).

7. Chaudhuri renders obvious independent claim 1by the following: "...identifying a set of features corresponding to the first object..." at col. 4, lines 39-41 and col. 1, lines 60-62.

Chaudhuri does not teach the use of hashing vectors, the summing of vectors, and the use of n-bit representations.

8. However, Dasgupta teaches the use of hashing vectors as follows: "...generating for each feature a hashing vector having n coordinates..." at col. 4, lines 26-28, col. 1, lines 60-65, and col. 10, lines 50-53.

It would have been obvious to one of ordinary skill at the time of the invention to combine Dasgupta with Chaudhuri to use hashing vectors in order to organize the vectors into groups related to properties to these groups. Chaudhuri and Dasgupta

teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations. Chaudhuri provides sets of features corresponding to objects and Dasgupta provides the hashing vectors. For independent claim 1, the term “piece” is used to suggest the term “feature”.

Dasgupta does not teach the summing of vectors and the use of n-bit representations.

9. However Lazarus teaches the summing of vectors as follows:
“...summing the hashing vectors to obtain a summed vector...” at col. 13, lines 6-9.
“...of the summed vector...” at col. 13, lines 6-9.
“...of the summed vector...” at col. 13, lines 6-9.
“...of the summed vector defining the compact representation of the first object...” at col. 13, lines 6-9, col. 9, lines 31-32, and col. 11, lines 4-6.

It would have been obvious to one of ordinary skill at the time of the invention to combine Lazarus with Chaudhuri and Dasgupta to sum vectors in order to use a standard mathematical method of establishing relationships between vectors. Chaudhuri, Dasgupta, and Lazarus teach the use of related applications. They teach the use of computers, the use of hashing, the use of vectors, and the use of representations and Chaudhuri and Lazarus teach the use of attributes and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, and Lazarus teaches the summing of vectors.

Lazarus does not teach the multiplication of n-bit representations.

10. However Kaufman teaches the multiplication of n-bit representations as follows:

"...and creating an n•x-bit representation..." at col. 3, lines 42-44, col. 4, lines 51-57, and col. 24, lines 21-27.

"...by calculating an x-bit value for each coordinate..." at col. 27, lines 17-22, col. 24, lines 21-27, and col. 25, lines 29-34.

"...the n • x-bit representation..." at col. 34, lines 21-27.

It would have been obvious to one of ordinary skill at the time of the invention to combine Kaufman with Chaudhuri, Dasgupta, and Lazarus to use multi-bit representations in order to use standardized computer structures defined in bits to represent vectors. Chaudhuri, Dasgupta, Lazarus, and Kaufman teach the use of related applications. They teach the use of computers, the use of vectors, and the use of representations, Chaudhuri, Dasgupta, and Kaufman teach the use of databases and the use of objects, and Chaudhuri, Lazarus, and Kaufman teach the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Lazarus provides the multiplication of vectors, and Kaufman provides n-bit representations of vectors.

11. As per claim 2, the "...set of features is a vector...," is taught by Chaudhuri at col. 1, lines 60-62 and col. 8, lines 51-53.

12. As per claim 3, the "...generating for each feature...," is taught by Chaudhuri at col. 20, lines 15-17 and col. 9, lines 14-17,

the "...hashing vector comprises...," is taught by Dasgupta at col. 10, lines 50-53,

the "...determining a weight associated with each feature...," is taught by Chaudhuri at col. 20, lines 48-50 and col. 9, lines 14-17,

the "...generating for each feature a hashing vector having n coordinates...," is taught by Dasgupta at col. 4, lines 26-28, col. 1, lines 60-65, and col. 10, lines 50-53,

the "...and multiplying each hashing vector...," is taught by Kaufman at col. 4, lines 47-51,

the "...by the weight determined for the corresponding feature...," is taught by Chaudhuri at col. 20, lines 48-50 and col. 9, lines 14-17.

13. As per claim 4, the "...object is a document...," is taught by Chaudhuri at col. 1, lines 60-62 and col. 2, lines 59-61.

14. As per claim 5, the "...each feature is a word within the document...," is taught by Chaudhuri at col. 9, lines 14-17, col. 8, lines 55-58, and col. 2, lines 59-61.

15. As per claim 7, the "...x is equal to 1...," is taught by Kaufman at col. 24, lines 21-27.

16. As per claim 8, the "...n is equal to 64...," is taught by Kaufman at col. 24, lines 21-27.

17. As per claim 9, the "...repeating acts (a) - (d) for a second object to create a second n•x-bit representation...," is taught by Kaufman at col. 1, lines 44-47, col. 6, lines 29-32, col. 5, lines 53-56, and col. 24, lines 21-27,

the "...and comparing the first and second n*x-bit representations...," is taught by Kaufman at col. 4, lines 51-57 and col. 24, lines 21-27,

and the "...to determine whether the first and second objects are similar...," is taught by Kaufman at col. 6, lines 29-32 and col. 21, lines 46-52.

18. As per claim 10, the "...discarding either one of the first or second objects...," is taught by Kaufman at col. 6, lines 16-19 and col. 6, lines 29-32.

19. As per claim 11, the "...repeating acts (a) – (d) for m objects to create m n•x-bit representations...," is taught by Kaufman at col. 1, lines 44-47, col. 6, lines 29-32, col. 5, lines 53-56, and col. 24, lines 21-27,

the "...and grouping the m objects...," is taught by Kaufman at col. 17, lines 21-26 and col. 6, lines 29-32,

and the "...based on their corresponding n•x-bit representations...,"is taught by Kaufman at col. 24, lines 21-27.

20. As per claim 13, the "...comprises generating for each feature...," is taught by Chaudhuri at col. 20, lines 15-17 and col. 9, lines 14-17,

the "...hashing vector having n coordinates...," is taught by Dasgupta at col. 10, lines 50-53,

the "...such that the hashing vectors...," is taught by Dasgupta at col. 10, lines 50-53,

and the "...are similar for similar features...," is taught by Chaudhuri at col. 23, lines 37-38 and col. 1, lines 60-62.

21. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, Lazarus, and Kaufman as applied to claim 1 above, and further in view of Broder et al. (U.S. Patent No. 6,349,296).

As per claim 6, the "...object is a summary of another object...," is not taught by either Chaudhuri, Dasgupta, Lazarus, or Kaufman.

However, Broder teaches the use of summaries of objects as follows:

"...The elements so selected constitute a sketch of the data object. The sketches characterize the resemblance of the data objects..." at col. 2, lines 45-47.

It would have been obvious to one of ordinary skill at the time of the invention to combine Broder with Chaudhuri, Dasgupta, Lazarus, and Kaufman to use summaries of documents in order to use a reduced representation of a document to facilitate comparison with other reduced representations. Chaudhuri, Dasgupta, Lazarus, Kaufman, and Broder teach the use of related applications. They teach the use of computers, the use of vectors, the use of objects, and the use of representations, Chaudhuri, Dasgupta, Lazarus, and Broder teach the use of hashing and Chaudhuri, Lazarus, Kaufman, and Broder teach the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Lazarus provides the summing of vectors, Kaufman provides n-bit representations of vectors, and Broder provides summaries of objects.

22. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, Lazarus, and Kaufman as applied to claim 11 above, and further in view of Deering (U.S. Patent No. 6,603,470).

As per claim 12, the "...compressing the objects by group...," is not taught by either Chaudhuri, Dasgupta, Lazarus, or Kaufman.

However, Deering teaches the compression of groups of objects as follows:

"...At step 200, an object is represented by an explicit group of triangles to be compressed, along with quantization thresholds for positions, normals, and colors..." at col. 14, lines 44-46.

It would have been obvious to one of ordinary skill at the time of the invention to combine Deering with Chaudhuri, Dasgupta, Lazarus, and Kaufman to compress groups of objects in order to reduce the amount of memory required by the representations of these objects. Chaudhuri, Dasgupta, Lazarus, Kaufman, and Deering teach the use of related applications. They teach the use of computers, the use of vectors, the use of objects, and the use of representations and Chaudhuri, Lazarus, Kaufman, and Deering teach the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Lazarus provides the summing of vectors, Kaufman provides n-bit representations of vectors, and Deering provides compression of groups of objects.

23. Claims 14-16, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri et al. (U.S. Patent No. 5,806,061), Dasgupta (U.S. Patent No. 5,612,865), and Caid et al. (U.S. Patent No. 5,794,178).

24. Chaudhuri renders obvious independent claims 14, 27, and 28, by the following:

"...generating a vector corresponding to the object..." at col. 20, lines 15-17, col. 8, lines 51-53, and col. 1, lines 60-62.

"...being associated with a corresponding weight..." at col. 20, lines 48-50.

"...to generate a product vector..." at col. 20, lines 15-17.

Chaudhuri does not teach the use of hashing vectors with associated coordinates, the use of compact representations, and the use of summed product vectors.

25. However, Dasgupta teaches the use of hashing vectors with associated coordinates as follows:

"...each coordinate of the vector..." at col. 10, lines 50-53.

"...associated with each coordinate in the vector by a corresponding hashing vector..." at col. 10, lines 50-53.

It would have been obvious to one of ordinary skill at the time of the invention to combine Dasgupta with Chaudhuri to use hashing vectors in order to organize the vectors into groups related to properties to these groups. Chaudhuri and Dasgupta teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations. Chaudhuri provides sets of features corresponding to objects and Dasgupta provides the hashing vectors.

Dasgupta does not teach the use of compact representations and the use of summed product vectors.

26. However, Caid teaches the use of compact representations and the use of summed product vectors as follows:

"...multiplying the weight..." at col. 20, lines 17-30.

"...summing the product vectors to obtain a summed product vector..." at col. 36, lines 27-31 and col. 12, lines 26-28.

"...and generating a compact representation of the object..." at col. 14, lines 23-25 and col. 14, lines 40-43.

"...using the summed product vectors..." at col. 12, lines 26-28.

It would have been obvious to one of ordinary skill at the time of the invention to combine Caid with Chaudhuri and Dasgupta to use summed product vectors and compact representations in order to determine the characteristics that are most representative of the objects and to reduce the amount of memory required by the representations of these objects. Chaudhuri, Dasgupta, and Caid teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations, Chaudhuri and Caid teach the use of attributes, the use of documents, the use of words, the use of values, and the use of features, and Dasgupta and Caid teach the use of networks and the use of coordinates. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, and Caid provides summed product vectors and compact representations.

27. As per claim 15, the "...weights are real numbers...," is taught by Caid at col. 20, lines 16-19.

28. As per claim 16, the "...weights include values between zero and one...," is taught by Caid at col. 20, lines 16-19, col. 17, lines 63-67, and col. 18, lines 1-3.

29. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, and Caid as applied to claim 14 above, and further in view of Broder.

As per claim 17, the "...object...," is taught by Chaudhuri at col. 1, lines 60-62, but ths "is a web document...," is not taught by either Chaudhuri, Dasgupta, or Caid.

However, Broder teaches the use of web documents as follows:

"...It should be kept in mind that when the input data records are Web documents, the combined size of the input data can be on the order of 300 Gbytes..." at col. 5, 59-61.

It would have been obvious to one of ordinary skill at the time of the invention to combine Broder with Chaudhuri, Dasgupta, and Caid to use web documents in order to have a source of documents outside to the immediate computer system and gain greater acceptance from potential users. Chaudhuri, Dasgupta, Caid, and Broder teach the use of related applications. They teach the use of computers, the use of hashing, the use of vectors, the use of objects, and the use of representations and Chaudhuri, Caid, and Broder teach the use of documents, the use of words, and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Caid provides summed product vectors and compact representations, and Broder provides web documents.

30. As per claim 18, the "...coordinates in the vector...," is taught by Dasgupta at col. 10, lines 50-53

and the "...correspond to words in the web document...," is taught by Broder at col. 5, lines 64-65 and col. 5, lines 59-61.

31. As per claim 19, the "...assigning the weights...," is taught by Caid at col. 20, lines 16-19,

the "...for each coordinate of the vector...," is taught by Dasgupta at col. 10, lines 50-53,

the "...as the number of occurrences of the word within the web document...," is taught by Broder at col. 9, lines 33-36, col. 5, lines 64-65, and col. 5, lines 59-61,

the "...divided by the number of web documents...," is taught by Broder at col. 7, lines 36-40, col. 7, lines 46-49, and col. 5, lines 59-61,

and the "...contained in a collection of web documents that contain the word...," is taught by Broder at col. 9, lines 50-51, col. 5, lines 59-61, and col 5, lines 64-65.

32. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, and Caid as applied to claim 14 above, and further in view of London (U.S. Patent No. 6,061,734).

As per claim 20, the "...values in the hashing vectors...," is taught by Caid at col. 5, lines 13-16, col. 36, lines 66-67, and col. 37, line 1,

the "...based on the coordinate corresponding to the hashing vector...," is taught by Dasgupta at col. 10, lines 50-53,

but the "...are generated using a pseudo random number generator seeded...," is not taught by either Chaudhuri, Dasgupta, or Caid.

However, London teaches the use of pseudo random number generators as follows:

"...In another embodiment of the present invention, a single hash function H is carried out on the identifier of the authorized user, the result being used as a seed for a pseudo-random number generator, which is then iterated n times to generate the n query integers k_1, k_2, ...k_n..." at col. 5, lines 32-36.

It would have been obvious to one of ordinary skill at the time of the invention to combine London with Chaudhuri, Dasgupta, and Caid to use pseudo random number

generators in order to generate query integers to be used in queries of the system. Chaudhuri, Dasgupta, Caid, and London teach the use of related applications. They teach the use of computers, the use of hashing, the use of vectors, and the use of representations and Chaudhuri, Caid, and London teach the use of words and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Caid provides summed product vectors and compact representations, and London provides pseudo random number generators.

33. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, and Caid as applied to claim 14 above, and further in view of Deering.

As per claim 21, the "...of the value of the coordinate...," is taught by Caid at col. 30, lines 25-27 and col. 31, lines 35-36,

but the "...each bit is generated based on the sign...," is not taught by either Chaudhuri, Dasgupta, or Caid.

However, Deering teaches the use of signs as follows:

"...More particularly, as shown by FIG. 3, the unit sphere is symmetrical by sign bits in the eight quadrants by sign bits. By allowing three of the normal representation bits to be the three sign bits of the xyz components of a normal, it then is only necessary to represent one eighth of the unit sphere..." at col. 10, lines 37-41.

It would have been obvious to one of ordinary skill at the time of the invention to combine Deering with Chaudhuri, Dasgupta, and Caid to use signs of numbers in order to specify whether a number is positive or negative. Chaudhuri, Dasgupta, Caid, and Deering teach the use of related applications. They teach the use of computers, the use

of vectors, the use of objects, and the use of representations and Chaudhuri, Caid, and Broder teach the use of words and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Caid provides summed product vectors and compact representations, and Deering provides bits representing signed numbers.

34. Claims 22, 23, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broder et al. (U.S. Patent No. 6,349,396) and Hatakeyama et al. (U.S. Patent No. 5,469,354).

35. Broder renders obvious independent claim 22 by the following:

"...creating a similarity sketch for each of first and second objects..." at col. 9, lines 38-39, col. 2, lines 45-47 and col. 4, lines 52-56.

"...to a vector representation of the first and second objects..." at col. 2, lines 53-55.

"...the similarity sketches for the first and second objects..." at col. 2, lines 45-47 and col. 4, lines 52-56.

"...and generating a value defining the similarity between the first and second objects..." at col. 7, lines 35-37 and col. 4, lines 52-56.

Broder does not teach the use of hashing functions or bitwise comparisons.

However, Hatakeyama teaches the use of hashing functions or bitwise comparisons as follows:

"...based on an application of a hashing function..." at col. 21, lines 39-42.

"...comparing, on a bit-by-bit basis..." at col. 15, lines 58-65.

"...based on a correspondence in the bit-by-bit comparison..." at col. 15, lines 58-65.

It would have been obvious to one of ordinary skill at the time of the invention to combine Hatakeyama with Broder to use hashing functions in order to reduce the size of the representation of objects for classification in hash buckets. Likewise, it would have been obvious to one of ordinary skill at the time of the invention to combine Hatakeyama with Broder to use bitwise comparison in order to determine the similarity between the representations of objects. Broder and Hatakeyama teach the use of related applications. They teach the use of computers, the use of documents, the use of words, the use of representations, the use of hashing, the use of values, and the measurement of similarity. Broder provides sketches, vectors, and objects and Hatakeyama provides hashing functions and bitwise comparisons.

36. As per claim 23, the "...determining that the first and second objects are similar...," is taught by Broder at col. 4, lines 52-56,

the "...when the value defining the similarity...," is taught by Broder at col. 7, lines 35-37 and col. 4, lines 52-56,

and the "...is greater than a predetermined threshold...," is taught by Broder at col. 8, lines 23-27.

37. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broder and Hatakeyama as applied to claim 22 above, and further in view of Caid and Kisor.

As per claim 24, the "...generating a vector corresponding to the first and second objects...," is taught by Broder at col. 2, lines 45-47 and col. 4, lines 52-56,

but the "…each coordinate of the vector being associated with a corresponding weight…,"

the "…multiplying the weight associated with each coordinate in the vector…,"

the "…by a corresponding hashing vector to generate a product vector…,"

the "…summing the product vectors…,"

the "…and calculating a bit corresponding to each coordinate…,"

and the "…of the summed product vector…," are not taught by either Broder or Hatakeyama.

However, Caid teaches the use of coordinates of vectors with weights as follows:

"…By virtue of this formula, we can see that each w_i vector is expressed as a weighted sum of a fixed set of N vectors (the u_j)…" at col. 20, lines 17-20.

"…If we reexpress our w_i vectors in terms of the u_j basis vectors (i.e., taking the first coordinate of this new representation to be the u_1 component, the second to be the u_2 component, and so on) we get…" at col. 20, lines 40-44.

It would have been obvious to one of ordinary skill at the time of the invention to combine Caid with Broder and Hatakeyama to use coordinates of vectors with weights in order to represent multi-dimensional space with a commonly used representation to gain acceptance of the system. Broder, Hatakeyama, and Caid teach the use of related applications. They teach the use of computers, the use of documents, the use of words, the use of representations, the use of hashing, the use of values, and the measurement of similarity and Broder and Caid teach the use of networks, the use of vectors, and the use of objects. Broder provides sketches, vectors, and objects, Hatakeyama provides

hashing functions and bitwise comparisons, and Caid provides coordinates of vectors with weights.

Caid does not teach the use of hashing vectors, the use of product vectors, and the summing of product vectors.

However, Kisor teaches the of hashing vectors, the use of product vectors, and the summing of product vectors as follows:

"…Study of the histographic distribution of the sums for the pixel elements of the different signal vectors suggested the foregoing hashing functions…" at col. 9, lines 49-51.

It would have been obvious to one of ordinary skill at the time of the invention to combine Kisor with Broder, Hatakeyama, and Caid to sum vectors in order to use a standard mathematical method of establishing relationships between vectors to gain acceptance of the system. Broder, Hatakeyama, Caid, Kisor teach the use of related applications. They teach the use of computers, the use of representations, the use of hashing, and the use of values, and Broder, Caid, and Kisor teach the use of networks and the use of vectors. Broder provides sketches, vectors, and objects, Hatakeyama provides hashing functions and bitwise comparisons, Caid provides coordinates of vectors with weights, and Kisor provides summing of hashing vectors to provide product vectors.

38. As per claim 25, the "...concatenating the generated bits...," is taught by Hatakeyama at col. 37, lines 19-22.

39. As per independent claim 26, the "...at least one processor...," is taught by Broder in Figure 1,

the "...a database comprising a plurality of documents...," is taught by Hatakeyama at col.45, lines 54-62,

the "...and a memory operatively coupled to the processor...," is taught by Broder in Figure 1,

the "...memory storing program instructions that when executed by the processor...," is taught by Broder in Figure 1,

the "...cause the processor to remove similar objects...," is taught by Broder at col. 10, lines 33-35 and col. 4, lines 52-56,

the "...from the database...," is taught by Hatakeyama at col.45, lines 54-62,

the "...by comparing similarity sketches of pairs of objects...," is taught by Broder at col. 2, lines 45-47 and col. 4, lines 52-56,

the "...in the database...," is taught by Hatakeyama at col.45, lines 54-62,

the "...and removing one of the objects of the pair...," is taught by Broder at col. 10, lines 33-35 and col. 4, lines 52-56,

the "...when the comparison indicates that the pair of objects...," is taught by Broder at col. 10, lines 48-49 and col. 4, lines 52-56,

the "...are more similar than a threshold level of similarity...," is taught by Broder at col. 8, lines 23-27

the "...processor generating the similarity sketches for each of the pair of objects...," is taught by Broder at col. 2, lines 46-47 and col. 4, lines 52-56,

the "...based on application of a hashing function...," is taught by Hatakeyama at col. 21, lines 39-42,

and the "...to vector representations of the objects...," is taught by Broder at col. 2, lines 53-55, col. 3, lines 1-4, and col. 4, lines 52-56.

40. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri et al. (U.S. Patent No. 5,806,061), Dasgupta (U.S. Patent No. 5,612,865), Caid et al. (U.S. Patent No. 5,794,178), and Hatakeyama et al. (U.S. Patent No. 5,469,354).

41. Chaudhuri renders obvious independent claim 29 by the following:

"...generating an object vector corresponding to the object..." at col. 20, lines 15-17, col. 8, lines 51-53, and col. 1, lines 60-62.

"...of the object vector..." at col. 1, lines 60-62 and col. 8, lines 51-53.

Chaudhuir does not teach the use of hashing vectors with coordinates, the use of summed vectors, the use of compact representations, and the concatenation of bits.

42. However, Dasgupta teaches the use of hashing vectors with coordinates as follows:

"...generating a hashing vector corresponding to each coordinate..." at col. 10, lines 50-53.

"...corresponding to each coordinate..." at col. 10, lines 50-53.

It would have been obvious to one of ordinary skill at the time of the invention to combine Dasgupta with Chaudhuri to use hashing vectors in order to organize the vectors into groups related to properties to these groups. Chaudhuri and Dasgupta teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of

representations. Chaudhuri provides sets of features corresponding to objects and Dasgupta provides the hashing vectors.

Dasgupta does not teach the use of summed vectors, the use of compact representations, and the concatenation of bits.

43. However, Caid teaches the use of summed vectors and compact representations as follows:

"...summing the hashing vectors to obtain a summed vector..." at col. 36, lines 27-31 and col. 12, lines 26-28.

"...of the summed product vector..." at col. 36, lines 27-31 and col. 12, lines 26-28.

"...and generating a compact representation of the object..." at col. 14, line 23 and col. 14, lines 40-43.

It would have been obvious to one of ordinary skill at the time of the invention to combine Caid with Chaudhuri and Dasgupta to use summed product vectors and compact representations in order to determine the characteristics that are most representative of the objects and to reduce the amount of memory required by the representations of these objects. Chaudhuri, Dasgupta, and Caid teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations, Chaudhuri and Caid teach the use of attributes, the use of documents, the use of words, the use of values, and the use of features, and Dasgupta and Caid teach the use of networks and the use of coordinates. Chaudhuri provides sets of features

corresponding to objects, Dasgupta provides the hashing vectors, and Caid provides summed product vectors and compact representations.

Caid does not teach the concatenation of bits.

44. However, Hatakeyama teaches the concatenation of bits as follows:
"...calculating at least one bit..." at col. 37, lines 19-22.
"...by concatenating the calculated bits..." at col. 37, lines 19-22.

It would have been obvious to one of ordinary skill at the time of the invention to combine Hatakeyama with Chaudhuri, Dasgupta, and Caid to concatenate calculated bits in order to reduce the size of representations of objects and to reduce the amount of memory required by the representations of these objects. Chaudhuri, Dasgupta, Caid, and Hatakeyama teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, and the use of representations and Chaudhuri, Caid, and Hatakeyama teach the use of documents, the use of words, and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Caid provides summed product vectors and compact representations, and Hatakeyama provides concatenation of calculated bits.

Response to Arguments

45. Applicant's arguments filed 9 May 2005 have been fully considered but they are not persuasive. In the first argument for independent claim 27 on page 11, paragraph 4, the Applicant states:

"Applicant respectfully disagrees with the rejection of claim 27 under 35 U.S.C. §§ 101 and 112. Claim 27 is written in means plus function format, as permitted by 35 U.S.C. § 112, sixth paragraph. Accordingly, the means for generating a vector, means for multiplying, and means for summing, all as recited in claim 27, are "construed to cover

the corresponding structure, material, or acts described in the specification and equivalents thereof." (35 U.S.C. § 112, sixth paragraph). Applicant submits that when properly construed, claim 27 covers structure described in the specification and is thus the rejection of this claim under U.S.C. §§ 101 and 112, first paragraph, should be withdrawn."

The Examiner disagrees. All of the limitations of independent claim 27 may be performed with paper and pencil. There is no indication in any of the limitations that a computer would be required to perform the described operations. For this reason, the means stated in the preamble could be paper and pencil and the rejections under 35 U.S.C. §§ 101 and 112 are proper.

46. In the second argument for independent claim 1 on page 13, paragraph 2, the Applicant states:

"Chaudhuri is generally unrelated to the invention recited in claim 1. Chaudhuri describes a method of optimizing the cost of searches through a multimedia repository that contains objects that includes attributes such as color and text. (Chaudhuri, Abstract). In other words, Chaudhuri appears to be related to enabling searches on objects based on more than just the textual portion of the object. Chaudhuri; however, in no way discloses, suggests, or is related to the invention recited in claim 1. Chaudhuri does not mention the concept of a compact representation of an object, much less disclose or suggest the specific technique recited in claim 1 for obtaining the recited n•x-bit representation that defines the compact representation of the object."

The Examiner disagrees. Applicant states "Chaudhuri describes a method of optimizing the cost of searches through a multimedia repository". This aspect of Chaudhuri is analogous to the stated goal of this application, which states "From a search engine's perspective, one problem in cataloging the large number of available web pages is that multiple ones of the web documents are often identical or nearly identical. Separately cataloging similar documents is inefficient and can be frustrating for the user if, in response to a request, a list of nearly identical documents is returned" at page 1, par.

0003 of the Specification. In other words, a goal of this application is to optimize the cost of searches and to return more meaningful search results. The limitation "n•x-bit representation that defines the compact representation of the object" is taught by a combination of Kaufman and Lazarus. Kaufmann teaches "n•x-bit representation" at col. 34, lines 21-27 and Lazarus teaches "that defines the compact representation of the object" at col. 13, lines 6-9, col. 9, lines 31-32, and col. 11, lines 4-6.

47. In the third argument for independent claim 1 on page 14, paragraph 1, the Applicant states:

"Although Dasgupta may be said to disclose a hashing method, Dasgupta does not disclose or suggest "generating for each feature a hashing vector having n coordinates." The Examiner points to column 10, lines 50-53 of Dasgupta as allegedly disclosing this feature of claim 1. This section of Dasgupta states: "Following a failure of Node 1, bucket 1 is reassigned to Node 2, and bucket 4 is reassigned to Node 3, i.e., the second coordinates in the hash vectors for buckets 1 and 4, respectively." Although this section of Dasgupta mentions "hash vectors," it in no way discloses or suggests generating for each feature a hashing vector having n coordinates, as recited in claim 1.

The Examiner disagrees. Dasgupta clearly teaches the association of coordinates with hashing vectors as follows:

"...Following a failure of Node 1, bucket 1 is reassigned to Node 2, and bucket 4 is reassigned to Node 3, i.e., the second **coordinates** in the **hash vectors** for buckets 1 and 4, respectively..." at col. 10, lines 50-53.

The "generating for each feature" is taught by Dasgupta at col. 4, lines 26-28 and col. 1, lines 60-65 where the term "piece" is used to suggest the term feature". For this reason, the limitation "generating for each feature a hashing vector having n coordinates" is taught by the combination of Dasgupta references.

48. In the fourth argument for independent claim 1 on page 14, paragraph 2, the Applicant states:

"In rejecting claim 1, the Examiner states that it would have been obvious to combine Dasgupta with Chaudhuri "to use hashing vectors in order to organize the vectors into groups related to properties to these groups." (Office Action, page 3). Applicant submits that this motivation statement for combining Dasgupta and Chaudhuri is a conclusory statement not derived from either Dasgupta or Chaudhuri. Additionally, it is not clear to Applicant how "organizing the vectors into groups" relates to the instant feature of claim 1, i.e., generating a hashing vector having n coordinates for each feature."

The Examiner disagrees. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Chaudhuri teaches the use of hash tables with vectors as follows:

"...To compute the probing cost for e.sub.1, the repositories are assumed to include a **hash table** that, given an object id o, returns the weight **vector** associated with o..." at col. 20, lines 47-49.

This teaching of Chaudhuri clearly points to the use of coordinates with hash vectors since coordinates are used to characterize vectors.

49. In the fifth argument for independent claim 1 on page 14, paragraph 3 and page 15, paragraph 1, the Applicant states:

"The Examiner points to column 9, lines 49-51 of Kisor as disclosing the feature of claim 1 of "summing the hashing vectors to obtain a summed vector." This section of Kisor states: "Study of the histographic distribution of the sums for the pixel elements of the

different signal vectors suggested the foregoing hashing functions." Thus, this section of Kisor relates to summing of pixel elements of signal vectors. It is unclear to Applicant how this section of Kisor could possible be construed to disclose or suggest summing of the hashing vectors recited in claim 1, which are generated as recited in the previous features of claim 1."

The Examiner disagrees. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection. The Kisor reference has been replaced by a Lazarus reference. Lazarus teaches the summing of vectors in a hash table as follows:

"...At each update position, a correction **vector** is calculated and **summed** into an accumulated correction **vector** located in the data items 404 of the stem **hash table** 400 (shown in FIG. 4)..." at col. 13, lines 6-9.

50. In the sixth argument for independent claim 1 on page 15, paragraph 2, the Applicant states:

"In applying Kisor, the Examiner's stated motivation is that it would have been obvious "to combine Kisor with Chaudhuri and Dasgupta to sum vectors in order to use a standard mathematical method of establishing relationshipsbetween vectors." (Office Action, page 4). Applicant submits that this motivation statement is conclusory and does make a proper prima facie case of obviousness. As previously mentioned, Applicant concedes that summing of vectors may be generally known in the art. This fact, however, would in no way disclose or suggest to one of ordinary skill in the art the specific features of claim 1 relating to summing the hashing vectors to obtain a summed vector."

The Examiner disagrees. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection. The Kisor reference has been replaced by a Lazarus reference. In response to Applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account

only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Since the Applicant concedes that summing of vectors may be generally known in the art the Applicant has admitted that a person of ordinary skill at the time of the invention would have used the summing of vectors as a means of processing vectors.

51. In the seventh argument for independent claim 1 on page 15, paragraph 3, the Applicant states:

"The Examiner points to various portions of Kaufman as disclosing the last feature recited in claim 1. (Office Action, pages 4-5). Applicant has reviewed Kaufman, and submits that Kaufman in no way discloses or suggests "creating an n • x –bit representation of the summed vector by calculating an x-bit value for each coordinate of the summed vector, the n•x-bit representation of the summed vector defining the compact representation of the first object," as recited in amended claim 1."

The Examiner disagrees. The term "n • x –bit representation" is ambiguous. What does it mean? Does it imply matrix multiplication? Kaufman teaches the use of matrix multiplication as follows:

"...The other projection process involves analytical computation of the projection plane parameters based on the multiplication of the x, y and z addresses using a transformation matrix involving matrix multiplication..." at col. 4, lines 47-51.

The limitation "n•x-bit representation that defines the compact representation of the object" is taught by a combination of Kaufman and Lazarus. Kaufmann teaches "n•x-bit representation" at col. 34, lines 21-27 and Lazarus teaches "that defines the compact

representation of the object" at col. 13, lines 6-9, col. 9, lines 31-32, and col. 11, lines 4-6.

52. In the eighth argument for claims 2-5, 7-10, and 13 on page 17, paragraph 3, the Applicant states:

"Claims 2-5, 7-11, and 13 recite additional features not disclosed or suggested by Chaudhuri, Dasgupta, Kisor, or Kaufman, either alone or in combination. Claim 5, for instance, states that each feature is a word within a document. The Examiner points to Chaudhuri, at column 9, lines 14-17, column 7, lines 60-64, and column 2, lines 59-61 as allegedly disclosing this feature of claim 5. Applicant respectfully disagrees with the Examiner's interpretation of Chaudhuri. These sections do not disclose that a feature is a word in a document. Although Chaudhuri, at column 9, lines 14-17, discloses "feature vectors associated with attributes," Chaudhuri does not disclose that the elements of these feature vectors are words. Accordingly, for at least this reason, in addition to its dependency, Applicant submits that Chaudhuri, Dasgupta, Kisor, and Kaufman, either alone or in combination, do not disclose each feature of claim 5."

The Examiner disagrees. Chaudhuri teaches the limitation in claim 5 at col. 9, lines 14-17, col. 8, lines 55-58, and col. 2, lines 59-61. Chaudhuri associates words with attributes at col. 8, lines 55-58. Since the responses to the second through the seventh arguments have shown that independent claim 1 is rendered obvious, claims 2-5, 7-10, and 13 are dependent on independent claims 1, this response answers the arguments for claim 5, and no additional arguments have been provided for claims 2-4, 7-10, and 13, then claims 2-5, 7-10, and 13 are still rendered obvious.

53. In the ninth argument for claim 11 on page 18, paragraph 1, the Applicant states:

"Dependent claim 11 recites repeating acts (a) – (d) for m objects to create m n • x –bit representations and grouping the m objects based on their corresponding n • x –bit representations. Neither Chaudhuri, Dasgupta, Kisor, nor Kaufman, either alone or in combination, disclose or suggest these features of claim 11. The Examiner states that Kaufman discloses these features of the invention and points to column 17, lines 21-26 of Kaufman. (Office Action, page 7). This section of Kaufman states: "In principle,

retrieval of these voxels from the 3-D Memory Storage Device 12 can be carried out by one of numerous possible retrieval methods, however, typically the memory storage scheme and/or memory organization of the 3-D Memory Storage Device 12 will constrain the manner in which voxels or groups of voxels can be accessed (e.g. retrieved) from the 3-D memory storage device 12." This section of Kaufman relates to retrieval of voxels from a storage device and in no way relates to grouping objects based on the representations recited in claim 11. Accordingly, for this reason also, the rejection of claim 11 is improper and should be withdrawn."

The Examiner disagrees. Kaufman teaches the creating (mapping or converting) of representations at col. 5, lines 53-56. Since the responses to the second through the seventh arguments have shown that independent claim 1 is rendered obvious, claim 11 is dependent on independent claims 1, this response answers to arguments for claim 11, then claim 11 is still rendered obvious.

54. In the tenth argument for claim 6 on page 18, paragraph 2 and page 19, paragraph 1, the Applicant states:

"Claim 6 depends from claim 1 and recites that the object is a summary of another object. In rejecting claim 6, the Examiner, in addition to citing Chaudhuri, Dasgupta, Kisor, and Kaufman, additionally relies on Broder. Specifically, the Examiner points to column 2, lines 45-47 of Broder, which relates to sketches of data objects, and states that it would have been obvious to combine the teachings of Broder "in order to use a reduced representation of a document to facilitate comparison with other reduced representations." Applicant submits that this rationale for combining the teachings of Broder with those of Chaudhuri, Dasgupta, Kisor, and Kaufman, is improper and does not make a prima facie case of obviousness. The Examiner is simply repeating an advantage of a document sketch discussed by Broder, but does not provide any motivation why one of ordinary skill in the art would modify Broder in view of Chaudhuri, Dasgupta, Kisor, and Kaufman to obtain the invention recited in claim 6. Additionally, Applicant submits that Broder does not cure the above-mentioned deficiencies of Chaudhuri, Dasgupta, Kisor, and Kaufman with respect to claim 1."

The Examiner disagrees. Lazarus teaches the use of compact representations (solutions) at col. 9, lines 31-32. There is no requirement for Broder to render obvious

independent claim 1 since a combination of teachings from Chaudhuri, Dasgupta, Lazarus, and Kaufman has already rendered obvious independent claim 1.

55. In the eleventh argument for claim 11 on page 19, paragraph 3, the Applicant states:

"Claim 12 depends from claim 11 and recites compressing the objects by group. In addition to Chaudhuri, Dasgupta, Kisor, and Kaufman, the Examiner relies on Deering in rejecting claim 12. The Applicant has reviewed Deering, and submits that Deering does not cure the above-mentioned deficiencies of Chaudhuri, Dasgupta, Kisor, and Kaufman with respect to claim 11. Accordingly, the rejection of claim 12 is improper and should be withdrawn."

The Examiner disagrees. The response to the ninth argument has shown that claim 11 is rendered obvious and claim 12 depends on claim 11 then claim 12 is also rendered obvious.

56. In the twelfth argument for independent claim 14 on page 20, paragraph 3, the Applicant states:

"As previously mentioned, Dasgupta generally discloses a hashing technique. Claim 14, however, recites more than simply hashing data. In particular, claim 14 recites "multiplying the weight associated with each coordinate in the vector by a corresponding hashing vector to generate a product vector." Dasgupta does not disclose or suggest this feature of claim 14. The Examiner points to column 10, lines 50-53 of Dasgupta as allegedly disclosing this feature of claim 14. This section of Dasgupta was quoted above. Although this section of Dasgupta generally mentioned "hash vectors," it in no way discloses or suggests multiplying each coordinate in a vector by a corresponding hashing vector, much less doing so with a vector such as that recited in claim 14. For at least this reason, Dasgupta, even if combined with Chaudhuri as the Examiner suggests, still does not disclose or suggest each feature of claim 14."

The Examiner disagrees. This limitation is taught by a combination of Caid and Dasgupta. Caid teaches "multiplying the weight" at col. 20, lines 17-30 and Dasgupta teaches "associated with each coordinate in the vector by a corresponding hashing vector" at col. 10, lines 50-53.

57. In the thirteenth argument for independent claim 14 on page 21, paragraph 1, the Applicant states:

"The Examiner further states that it would have been obvious to combine Dasgupta with Chaudhuri "to use hashing vectors in order to organize the vectors into groups related to properties to these groups." (Office Action, page 10). Applicant submits that this motivation statement for combining Dasgupta and Chaudhuri is a conclusory statement not derived from either Dasgupta or Chaudhuri. Additionally, it is not clear to Applicant how "organizing the vectors into groups" relates to the instant feature of claim 14, i.e., multiplying the weight associated with each coordinate in the vector by a corresponding hashing vector to generate a product vector."

The Examiner disagrees. Dasgupta teaches the use of buckets. Buckets are means of organizing objects into groups with one group per bucket. Dasgupta further associates hashing vectors with the buckets (groups) at col. 10, lines 50-53. Therefore, it is quite reasonable to suggest that the properties of objects could be used as criteria for selecting buckets (groups) for these objects. The response to the twelfth argument shows that the limitation cited is taught by a combination of Caid and Dasgupta.

58. In the fourteenth argument for independent claim 14 on page 22, paragraphs 1 and 2, the Applicant states:

"More specifically, the Examiner points to column 14, line 23 and column 14, lines 40-43 of Caid as disclosing "generating a compact representation of the object," as recited in claim 14, Column 14, line 23 of Caid discloses generating "a relatively compact display." This compact display of Caid refers to using graphical icons to represent documents, (Caid, column 23, lines 10-22). Column 14, lines 40-43 of Caid also refers to the generation of visual objects. Applicant submits that using a graphical icon as a compact display is not consistent with claim 14 as a whole, in which a compact representation of an object is generated using summed product vectors that are generated according to the previous acts recited in claim 14.

The Examiner additionally points to column 12, lines 26-28 as disclosing "using the summed product vectors." This section of Caid generally discloses taking a dot product of "summary vectors with the query vector." Again, Applicant submits that the Examiner appears to be picking and choosing isolated sections of Caid and applying these sections to isolated phrases within claim 14 without considering claim 14 as a whole. Applicant concedes that the general concept of vectors and vector operations are

known in the art. However, claim 14 recites more than simply using vectors, instead claim 14 recites a combination of features including summing product vectors to obtain a summed product vector. Caid in no way discloses or suggests this feature of claim 14."

The Examiner disagrees. A compact display of an object is clearly a compact visual representation of an object. This claim does not exclude visual representations. Caid teaches the use of summed vectors as follows:

"...The context **vector** for each stem in a document is weighted according to various formulae, **summed together**, then normalized to create the document CV..." at col. 36, lines 29-31.

A dot product of two vectors is a product vector. The Applicant may wish to specify the operation, which produces the product vector. Any such change in the claims should be backed up by a reference to the Specification.

59. In the fifteenth argument for independent claim 14 on page 22, paragraph 4 and page 23, paragraph 1, the Applicant states:

"Additionally, Applicant submits that the Examiner has not made a proper prima facie case of obviousness based on Chaudhuri, Dasgupta, and Caid. For example, as motivation for combining Caid with Chaudhuri and Dasgupta, the Examiner states "to use summed product vectors and compact representations in order to determine the characteristics that are most representative of the objects and to reduce the amount of memory required by the representations of these objects." (Office Action, page 11). Applicant submits that this motivation for combining Chaudhuri, Dasgupta, and Caid is conclusory and provides no logical explanation for why one of ordinary skill in the art would combine Dasgupta, Chaudhuri, and Dasgupta as the Examiner suggests."

The Examiner disagrees. Caid teaches the use of compact displays (representations) as follows:

"...Thus, a relatively compact display could be generated, without a need for high-powered processors to generate the artificial reality display described above..." at col. 14, lines 23-25.

A compact display would require less detail than a more extensive display and therefore would require less memory in a computer system to store the representation.

60. In the sixteenth argument for claims 15 and 16 on page 23, paragraph 2, the Applicant states:

"Accordingly, Applicant submits that the rejection of claim 14 is improper and should be withdrawn. Claims 15 and 16 depend from claim 14. For at least this reason, the rejection of claims 15 and 16 should also be withdrawn."

The Examiner disagrees. Since the responses to the twelfth through the fifteenth arguments have shown that independent claim 14 is rendered obvious, claims 15 and 16 depend of independent claim 14, and no additional arguments have been provided for either claim 15 or claim 16 then claims 15 and 16 are still rendered obvious.

61. In the seventeenth argument for independent claims 27 and 28 on page 23, paragraph 3, the Applicant states:

"Claims 27 and 28 include features similar to those recited in claim 14. Accordingly, based on the rationale given above relating to claim 14, Applicant submits the rejection of claims 27 and 28 is improper and should also be withdrawn."

The Examiner disagrees. Since the responses to the twelfth through the fifteenth arguments have shown that independent claim 14 is rendered obvious and independent claims 27 and 28 provide essentially the same limitations as independent claim 14 then independent claims 27 and 28 are still rendered obvious.

62. In the eighteenth argument for claims 17-19 on page 23, paragraph 4, the Applicant states:

"Claims 17-19 are dependent claims that further define the features of claim 14. The Examiner additionally relies on Broder in rejecting these claims. (Office Action, page 11). Applicant submits that Broder does not cure the above-mentioned deficiencies of claim 14. For at least this reason, the rejection of claims 17-19 should be withdrawn."

The Examiner disagrees. Since a combination of Dasgupta, Chaudhuri, and Caid has already rendered obvious independent claim 14, there is no requirement that Broder also render obvious this claim. Since the responses to the twelfth through the fifteenth arguments have shown that independent claim 14 is rendered obvious, claims 17-19 are dependent on independent claim 14, and no additional arguments have been provided for any of these claims then claims 17-19 are still rendered obvious.

63. In the nineteenth argument for claim 20 on page 24, paragraphs 2 and 3 and page 25, paragraphs 1 and 2, the Applicant states:

"Claim 20 recites "wherein values in the hashing vectors are generated using a pseudo random number generator seeded based on the coordinate corresponding to the hashing vector." It appears that the Examiner is relying on separate portions of three different references (Caid, Dasgupta, and London) to disclose the recitations of claim 20. (Office Action, page 13). Again, Applicant reiterates that instead of analyzing the claim as a whole, the Examiner is performing a piecemeal analysis of claim 20. In the instant case, not only is the Examiner not analyzing the claim as a whole, the Examiner is not even analyzing a single feature or act of the claim as a whole.
Although London discloses using a hash function to generate a pseudo-random number, (London, column 5, lines 32-36), this does not disclose or suggest the recitations of claim 20, i.e., "wherein values in the hashing vectors are generated using a pseudo random number generator seeded based on the coordinate corresponding to the hashing vector." Using the output value of a hash function as a pseudo-random number as disclosed by London does not disclose or suggest generating values in a hashing vector using a pseudo random number generator.
For at least these reasons, Applicant submits that London does not cure the deficiencies of Chaudhuri, Dasgupta, and Caid with regard to claim 20. Accordingly, Chaudhuri, Dasgupta, Caid, and London, either alone or in combination, do not disclose or suggest each element of claim 20. Additionally, Applicant submits that the Examiner has not made a proper prima facie case of obviousness with regard to claim 20. For this reason also, the rejection of claim 20 is improper and should be withdrawn."

The Examiner disagrees. Claim 20 is rendered obvious by a combination of teachings of Dasgupta, Caid, and London. Responses to the twelfth through the fifteenth arguments have shown that independent claim 14 is rendered obvious, the Applicant concedes that

London discloses using a hash function to generate a pseudo-random number, and Caid teaches the use of "values in the hashing vectors" at col. 5, lines 13-16, col. 36, lines 66-67, and col. 37, line 1 then claim 20 is still rendered obvious. London teaches the use of a pseudo-random number for queries.

64. In the twentieth argument for claim 21 on page 25, paragraph 3, the Applicant states:

"Claim 21 is a dependent claim that further defines the features of claim 14. The Examiner additionally relies on Deering in rejecting claim 21. (Office Action, page 11). Applicant submits that Deering does not cure the above-mentioned deficiencies of claim 14. For at least this reason, the rejection of claim 21 should be withdrawn."

The Examiner disagrees. Since a combination of Dasgupta, Chaudhuri, and Caid has already rendered obvious independent claim 14, there is no requirement that Deering also render obvious this claim. Since the responses to the twelfth through the fifteenth arguments have shown that independent claim 14 is rendered obvious, claim 21 is dependent on independent claim 14, and no additional arguments have been provided this claim then claim 21 is still rendered obvious.

65. In the twenty-first argument for claim 22 on page 26, paragraph 3 and page 27, paragraph 1, the Applicant states:

"In summary, this section of Hatakeyama discloses using a hash function (5-1) to generate correspondences between characters of a search term and positions in a bit list. Hash function (5-1) of Hatakeyama, however, is not used by Hatakeyama to generate similarity sketches, and is certainly not used by Hatakeyama in the specific manner recited in claim 22. That is, Hatakeyama does not disclose or suggest generating a similarity sketch based on an application of a hashing function to a vector representation of the first and second objects, as recited in claim 22. Accordingly, Hatakeyama does not cure the admitted deficiency of Broder.

The Examiner disagrees. This limitation is taught by a combination of the Broder and Hatakeyama references. Broder teaches "creating a similarity sketch for each of first and second objects" at col. 9, lines 38-39, col. 2, lines 45-47 and col. 4, lines 52-56 and "to a vector representation of the first and second objects" at col. 2, lines 53-55 and Hatakeyama teaches "based on an application of a hashing function" at col. 21, lines 39-42.

66. In the twenty-second argument for claim 22 on page 27, paragraph 2, the Applicant states:

"Additionally, Applicant submits that one of ordinary skill in the art would not be motivated to modify Broder to use the hashing function disclosed by Hatakeyama. Although Broder discloses specific techniques for calculating sketches, the sketches of Broder are not created in the manner in which the similarity sketches of claim 22 are created. Hatakeyama does not even mention a similarity sketch. Thus, one of ordinary skill in the art would not be motivated to modify Broder to use a different technique to calculate a similarity sketch, as Hatakeyama does not disclose any different technique. The Examiner is impermissibly using hindsight taken from Applicant's specification in modifying Broder as suggested."

The Examiner disagrees. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Broder teaches the use of a hash table at col. 10, lines 55-57. It would have been obvious to one of ordinary skill at the time of the invention to combine

Hatakeyama with Broder to use hashing functions in order to reduce the size of the fingerprints of objects for classification into hash tables.

67. In the twenty-third argument for claim 23 on page 27, paragraph 3, the Applicant states:

For at least these reasons, Broder and Hatakeyama, either alone or in combination, fail to disclose or suggest the features of claim 22 and the rejection of this claim should be withdrawn. The rejection of dependent claim 23 should also be withdrawn, at least by virtue of its dependency on claim 22."

The Examiner disagrees. Since the responses to the twenty-first and twenty-second arguments have shown that independent claim 22 is rendered obvious, claim 23 is dependent on independent claim 22, and no additional arguments have been provided this claim then claim 23 is still rendered obvious.

68. In the twenty-fourth argument for claim 26 on page 27, paragraph 4 and page 28, paragraph 1, the Applicant states:

"Claim 26 was also rejected based on Broder and Hatakeyama. Claim 26 recites, among other things, a processor generating similarity sketches for each of a pair of objects based on application of a hashing function to vector representations of the objects. As discussed above regarding claim 22, Broder and Hatakeyama do not disclose or suggest any such feature. Accordingly, the rejection of claim 26 under 35 U.S.C. § 103(a) should also be withdrawn."

The Examiner disagrees. The twenty-fourth argument is essentially a restatement of the limitation of independent claim 22, which is rendered obvious in the response to the twenty-first argument. Since the responses to the twenty-first and twenty-second arguments have shown that independent claim 22 is rendered obvious, claim 23 is dependent on independent claim 22, and the response to the argument above shows

that this is a restatement of a limitation in independent claim 22 then claim 23 is still rendered obvious.

69. In the twenty-fifth argument for claim 24 on page 28, paragraph 3, the Applicant states:

"The Examiner contends that Broder discloses generating a vector corresponding to the first and second objects but relies on Caid and Kisor to disclose the remaining features of claim 24. (Office Action, page 16). Although Caid and Kisor may be said to generally disclose vector operations, neither Caid nor Kisor disclose creating similarity sketches for objects. Thus, one of ordinary skill in the art would not be motivated to modify Broder to calculate a similarity sketch as recited in detail in claim 24. The Examiner is again performing a piecemeal analysis of claim 24 and is not considering the claim as a whole. Accordingly, the Examiner has not made a prima facie case of obviousness with regard to claim 24."

The Examiner disagrees. Since the responses to the twenty-first and twenty-second arguments have rendered obvious independent claim 22 there is no requirement for Caid and Kisor to also render obvious claim 22. Since claim 24 is dependent on independent claim 22 and no additional arguments have been provided specifically for this claim then claim 24 is still rendered obvious.

70. In the twenty-sixth argument for claim 29 on page 29, paragraph 3, the Applicant states:

"The Examiner contends that Chaudhuri discloses generating an object vector corresponding to the object, as recited in claim 29, but relies on Dasgupta, Caid, and Hatakeyama to disclose the remaining features of claim 29. Based on arguments similar to those given above, Applicant submits that the Examiner has not made a prima facie case of obviousness regarding claim 29. Specifically, although Dasgupta, Caid, and Hatakeyama may generally disclose hashing and vector operations, one of ordinary skill in the art would not be motivated to combine Chaudhuri, Dasgupta, Caid, and Hatakeyama as the Examiner suggests. The Examiner is performing a piecemeal analysis of claim 29 by applying different references to isolated phrases in claim 29 without regard to the claim as a whole. Thus, the Examiner has not made a prima facie case for obviousness and the rejection should be withdrawn."

The Examiner disagrees. The Applicant questions the motivations to combine these sources in the fourth, fifteenth, and twenty-second arguments. For this reason, when combined the responses to these arguments are valid for the twenty-sixth argument.

Conclusion

71. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

72. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harold E. Dodds, Jr. whose telephone number is (571)-272-4110. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on (571)-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harold E. Dodds, Jr.

Harold E. Dodds, Jr.
Patent Examiner
July 21, 2005

GRETA ROBINSON
PRIMARY EXAMINER